# STERILIZER COMPOSITION FOR BRAN

Patent Number: JP62155203
Publication date: 1987-07-10
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Requested Patent: JP62155203
Application Number: JP19850293886 19851227
Priority Number(s):
IPC Classification: A01N59/00; A01N25/30
EC Classification:
Equivalents: JP1913973C, JP6017289B

## Abstract

PURPOSE:The titled composition having improved germicidal effects even in the presence of organic substances such as dung, etc., containing a cationic surface active agent, an inorganic peroxide and preferably further an activator for the inorganic peroxide as essential components.
CONSTITUTION:The titled composition containing (A) 1pt.wt. cationic surface active agent (e.g., alkyldimethylbenzylammonium salt), (B) 0.1-10pts.wt. inorganic peroxide (e.g., sodium percarbonate) and (C) 0.1-10pts.wt. activator (e.g., glucose pentaacetate) for the component B. It is considered that germicidal effects are obtained by conjugated effects of an organic peracid obtained from the components B and C and the component A to cause irreversible denaturation on cell membrane of bacteria, etc.

Translation of JP Patent Laid-Open Publication No. 62-155203
Laid Open July 10, 1987
Title of the invention:

Sterilizing Composition for Cattle Shed

Application No. 60-293886 December 27, 1985
Applicant: Eizai Co. Ltd and Kao Corporation

SPECIFICATION

1. Title: Sterilizing Composition for Cattle Shed

2. Claims

1. A sterilizing composition for cattle sheds comprising a cationic surface-active agent and inorganic peroxide.

2. A sterilizing composition for cattle sheds comprising a cationic surface-active agent, inorganic peroxide and inorganic peroxide activation agent.

3. A sterilizing composition of claim 2, said organic peroxide being polyhydric alchohol.

3. Detailed Description of the Invention

[Industrial Utilization]

This invention relates to a sterilizing composition to be used in cattle sheds. More particularly, this invention relates to a sterilizing composition for cattle sheds which provides excellent sterilization in the presence of organic substances generated from dung or droppings.

[Prior Art & Problem to be Solved]

Cationic surface-active agents such as salts of alkylbenzyldimethylammonium, substituted benzalkonium, benzethonium or dialkyldimethylammonium do not show a

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satisfactory sterilizing effect when used in cattle sheds where dung or droppings are present because dung or droppings deteriorate the sterilizing function of cationic surface-active agents.

[How to Solve the Problem]

The inventors of the present invention arrived at the present invention after a laborious research. They discovered that combinations of a cationic surface-active agent and inorganic peroxide show excellent sterilization even when exposed to dung or droppings.

Cationic surface-active agents which are utilizable for the present invention may be any cationic surface-active agent that possesses sterilizing activity including salts of monocationic compounds such as alkylbenzyldimethylammonium, substituted benzalkonium, benzethonium, dialkyldimethylammonium or polycationic compounds such as salts of N-alkyl-N,N,N′,N′,N′-pentamethyl-propyleneammonium.

Inorganic peroxides which are utilizable for the present invention include sodium percarbonate, sodium perborate, sodium peroxypyrophosphate and sodium peroxysilicate.

A sterilizing composition of the present invention comprises a cationic surface-active agent and an inorganic peroxide in any mixing ratio. From the aspect of sterilizing effect and economy, it is preferable that 1 part by weight of cationic surface-active agent and 0.1-100 parts by weight of inorganic peroxide are blended. More preferably, the mixing ratio is 1 to 0.3-50 (parts by weight). Outside of the foregoing mixing rati , the attainable sterilizing effect will

be substantially poorer.

The sterilizing composition of the present invention may be provided in powder, granule or tablet forms. In use, they are diluted with water to 10-1000 ppm.

It is within the scope of the present invention to separately prepare a cationic surface-active agent and an inorganic peroxide agent and subsequently mix them in water before use.

Addition of an inorganic peroxide activation agent has been found to promote the sterilization effect of the sterilizing composition of the present invention. Therefore, the present invention also provides a sterilizing composition comprising a cationic surface-active agent, inorganic peroxide and inorganic peroxide activation agent.

Inorganic peroxide activation agents that can be utilized for the present invention include acetates of polyhydric alcohol such as glucose penta-acetate, glucose tetra-acetate, furactose penta-acetate, pseuclose octa-acetate, sorbitan tetra-acetate, sorbitol hexa-acetate, mannite hexa-acetate, mannitan tetra-acetate, xylite penta-acetate, xyliton tri-acetate or erythritol tetra-acetate, and N-acetylated compounds such as tetra-acetylethylenediamine and tetra-acetylglicoluryluryl. Organic acid anhydrates such as phthalic anhydrate and succinic anhydrate may be equally used.

Any relative amounts in weight of a cationic surface-active agent, inorganic peroxide and inorganic peroxide activation agent may be blended together. However, in view of storage stability, sterilization and economy, it is preferred that 1 part by weight of a cationic surface-active agent, 0.1-10 parts by weight of an inorganic peroxide and 0.1-10 parts by weight of an activation agent are blended. The mixing ratio

of the inorganic peroxide and the activati n agent is preferably 100-1 to 1-100 by weight. More preferably, th mixing ratio is 10-1 to 1-10.

[Function & Effect]

It is not perfectly clear why or how the sterilizing composition of the present invention works under the presence of dung or droppings. It is presumed that cooperativity of the cationic surface-active agent and the organic peroxide generated from the inorganic peroxide and the activation agent causes irreversible denaturation in the cell membranes of bacteria, etc.

[Embodiment]

Embodiments 1 and 2 of the present invention are described below. It is to be noted that these embodiments are not meant to restrict the scope of the present invention in any way.

Embodiment 1:

Varied concentrations of test samples were prepared by blending sodium percarbonate (PC) and glucose penta-acetate (GPA) into alkyl(12 carbon atoms)benzyldimethylammonium chloride. Fowl droppings (5 wt.%) were dispersed in the test samples. Then, the test samples were kept contacting colon bacilli (which had been cultured in liquid mediums) for five minutes. The colon bacilli were collected and cultured in fresh mediums independently. The mediums were left for 24 hours. Table 1 shows the states of the colon bacilli after the twenty-four hours.

**Evaluation:**

**(-) No colony formation**

**(±) Up to five colonies**

**(+) More than five colonies**

**TABLE 1**

| PC/GPA weight | Concentration PC/GPA ppm | Alkylbenzyldimethylammonium chloride 0 | 10 | 50 | 100 ppm |
|---|---|---|---|---|---|
| 0 | 0 | + | + | ± | - |
| 99/1 | 10 | + | + | ± | - |
| | 50 | + | + | ± | - |
| | 100 | + | ± | ± | - |
| 70/30 | 10 | + | ± | - | - |
| | 50 | + | - | - | - |
| | 100 | + | - | - | - |
| 50/50 | 10 | + | ± | - | - |
| | 50 | + | - | - | - |
| | 100 | + | - | - | - |
| 30/70 | 10 | + | ± | - | - |
| | 50 | + | - | - | - |
| | 100 | + | - | - | - |
| 1/99 | 10 | + | + | ± | - |
| | 50 | + | + | ± | - |
| | 100 | + | ± | ± | - |
| 100/0 | 10 | + | + | ± | - |
| | 50 | + | + | ± | - |
| | 100 | + | + | ± | - |
| 0/100 | 10 | + | + | ± | - |
| | 50 | + | + | ± | - |
| | 100 | + | + | ± | - |

Embodiment 2:

Varied concentrations of test samples were prepared by blending sodium percarbonate (PC) and tetra-acetylethylenediamine (TAEDA) into alkyl(10 carbon atoms)benzyldimethylammonium chloride. Fowl droppings (5 wt.%) were dispersed in the test samples. Then, the test samples were kept contacting colon bacilli (which had been cultured in liquid mediums) for five minutes. The colon bacilli were collected and cultured in fresh mediums independently. The mediums were left for 24 hours. Table 2 shows the states of the colon bacilli after the twenty-four hours.

TABLE 2

| PC/TAEDA Concentration | | Alkylbenzyldimethylammonium chloride | | | |
|---|---|---|---|---|---|
| weight | PC/TAEDA ppm | 0 | 10 | 50 | 100 ppm |
| 0 | 0 | + | ± | - | - |
| 99/1 | 10 | + | ± | - | - |
| | 50 | + | ± | - | - |
| | 100 | + | - | - | - |
| 70/30 | 10 | + | - | - | - |
| | 50 | + | - | - | - |
| | 100 | + | - | - | - |
| 50/50 | 10 | + | - | - | - |
| | 50 | + | - | - | - |
| | 100 | + | - | - | - |
| 30/70 | 10 | + | - | - | - |
| | 50 | + | - | - | - |
| | 100 | + | - | - | - |

| | | | | | |
|---|---|---|---|---|---|
| 1/99 | 10 | + | ± | - | - |
| | 50 | + | ± | - | - |
| | 100 | + | - | - | - |
| 100/0 | 10 | + | ± | - | - |
| | 50 | + | ± | - | - |
| | 100 | + | ± | - | - |
| 0/100 | 10 | + | ± | - | - |
| | 50 | + | ± | - | - |
| | 100 | + | ± | - | - |